CLAIMS:

1. A refrigerant compressor rotatable impeller assembly comprising:

a rotatable shaft having a driving end;

an impeller having an axial bore, and a front face intersecting with said axial bore, wherein the impeller is operably engaged with the driving end of the rotatable shaft;

a spacer body comprising a front face, a rear face, a recessed spring bearing surface in the rear face and a central bore;

a fastener positioned through said axial and central bore, said fastener having a rear end to connect to said rotatable shaft and a headed front end to seat against the front face of said spacer body to provide a clamping load.

2. The invention of claim 1 wherein the front face of said contoured spacer body is continuously contoured from the front face of said impeller to said central bore.

3. The invention of claim 2 further including a protective washer seated against said front face and having an aperture registered with said axial bore and wherein the spacer body includes a spring spacing abutment positioned to seat against said protective washer.

4. The invention of claim 3 further including a tension providing device seated between said protective washer and said spring bearing surface wherein said tension providing device includes at least one spring.

5. The invention of claim 4 wherein said at least one spring is collapsed to a preferred percentage of its maximum deflection when said spring spacing abutment is seated against said protective washer.

6. The invention of claim 5 wherein said at least one spring is a Belleville spring and the preferred percentage is about 75%.

7. The invention of claim 1 wherein said rear face of said spacer body further comprises at least one shoulder.

8. The invention of claim 1 wherein said headed front end comprises a front face at least substantially spanning said central bore to make a substantially continuous surface.

9. The invention of claim 3 wherein the front face of said impeller further comprises a recess sized to accommodate said protective washer.

10. The invention of claim 3 wherein the front face of said impeller further comprises a recess to accommodate said protective washer, and at least one spring.

11. The invention of claim 1 wherein said front face of said contoured spacer body further comprises a recess sized to accommodate said headed front end.

12. The invention of claim 1 wherein said contoured spacer body and said headed front end are combined to form a contoured front end.

13. An impeller and shaft assembly system for a centrifugal compressor comprising:

a rotatable shaft;

an impeller operably engaged with the rotatable shaft and having an aerodynamically contoured front face and an end surface at a distal end of the front face;

a contoured spacer body positioned at the impeller end and having a contour matching the contour face of the impeller, the contoured spacer body including a recess;

a fastener operatively engaged with the contoured spacer body and the rotatable shaft so as to maintain the impeller and rotatable shaft in connection; and

an expansor with a known axial expansive force and providing a known axial force between the contoured spacer body and the impeller.

14. The system of claim 13 further including a protective washer in the recess between the impeller and the contoured spacer body.

15. The system of claim 14 wherein the contoured spacer body, the protective washer, and the impeller each have a radial bore, all in alignment.

16. The system of claim 15 wherein the fastener is a pinion bolt operably inserted through the bores of the contoured spacer body, protective washer and impeller to engage an end of the rotatable shaft.

17. The system of claim 16 wherein the impeller has blades.

18. The system of claim 17 wherein the fastener has a head, the contoured spacer body has a second recess, and wherein the head of the fastener is operably engaged with the second recess.

19. The system of claim 18 wherein the contoured spacer body has an abutment located proximal the fastener and sized to control the load on the expansor.

20. The system of claim 19 wherein the expansor comprising a Belleville spring.

21. The system of claim 18 wherein the contoured spacer body has a first shoulder radially spaced from the fastener.

22. The system of claim 21 wherein the first shoulder engages the end surface of the impeller.

23. The system of claim 21 wherein the first shoulder engages the protective washer.

24. The system of claim 23 further including a second shoulder located proximal the fastener and engaging the protective washer.

25. An impeller and shaft assembly for a centrifugal compressor comprising:

a rotatable shaft;

an impeller having a rear face operably engaged with the rotatable shaft, an aerodynamically contoured front face, and an end surface at a distal end of the front face;

a protective washer having an inner surface engaging the end surface and having an outer surface;

a fastener operatively engaged with the rotatable shaft so as to maintain the impeller and rotatable shaft in connection, the fastener including a domed front end having a rear surface engaging the outer surface of the protective washer.

26. The system of claim 25 including an expansor with a known axial expansive force and providing a known axial force between the impeller and the domed front end.

27. The system of claim 26 the protective washer and the impeller each having a radial bore in alignment, and the fastener a including fastener portion passing through the radial bore, wherein the domed front end has an abutment located proximal the shaft of the fastener and sized to control the load on the expansor.

28. The system of claim 27, the impeller having a recess, the end surface being located in the recess and the recess containing the protective washer, the expansor, and the domed front end.

29. The system of claim 27 the impeller containing a recess, the recess containing the protective washer, the expansor, and the abutment, the domed front end including a rear front face which engages the end surface of the impeller.

30. The system of claim 27 wherein the domed front end includes a first shoulder radially spaced from the abutment and the expansor.

31. The system of claim 27 wherein the expansor is a Bellville spring.

32. The system of claim 27 wherein a front face of the domed front end provides a continuous aerodynamic surface across the front face of the impeller.

33. The system of claim 32 wherein the protective washer includes a radially spaced outer end having an aerodynamic contour.

34. A spacer body comprising:

a front face having an aerodynamic contour symmetrically arranged about an axis;

a rear face axially spaced from the front face;

a recessed spring bearing surface in the rear face;

a spring spacing abutment projecting in an axial direction from the bearing surface; and

a central bore.

35. The spacer body of claim 34 wherein the front face of the spacer body is continuous from a radial extremity of the front face to the axis.

36. The spacer body of claim 35 wherein the abutment includes at least one shoulder.

37. The spacer body of claim 36 wherein the front face of the spacer body includes a recess.

38. The spacer body of claim 37 wherein the abutment is sized to control the axial load on an expansor when the expansor is located radially outward of the abutment.

39. The spacer body of claim 38 including a second recess.

40. The spacer body of claim 35 wherein the abutment includes a first shoulder radially spaced from the axis.

41. The spacer body of claim 40 wherein the abutment includes a second shoulder located proximal the axis.